University of Tripoli - Faculty of Engineering

Electrical & Electronic Engineering Department
Final Exam Time: 2 hr Fall 2018

EE463

12/2/2019

conditioning circuit for (0-3V) ADC.(use voltage divider circuit ,Vs=9V,R1=200Ω). O1) a-Using RTD PT100 for temperature range (22C to 190C),design a signal

b-If we will send the sensor output for a distance with same voltage reference.

c-What is the ADC digital output if the temperature is 100C.

d-What is the temperature if the ADC output is (10011110),

red=2v[14pis]

range (±30g) and using voltage to frequency converter VFC (scale factor= 4V/6KHz) (sensitivity =0.14mA/g), with offset 7mA@0g, a-Draw the block diagram of the operation. (2) Using Acceleration sensor

b-Calculate the sensor output range, and VFC output range, digital output of counter if the sampling is each 0.2Sec.

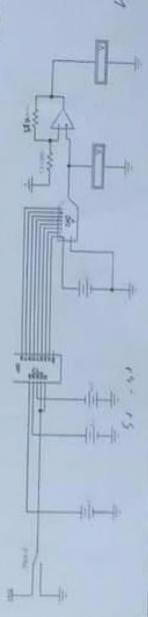
c-What is the value of the output of the counter if the acceleration is -0.5g.

(10 pts)

range used for measuring level (Vs=9Vuse, R1=150 Ω), Design) circuit to turn ON green Q3) Barometer sensor sensitivity is 5mV/ bar, and 5Ω/cm pot. level sensor for 150cm HO pts LED if (level more than 70cm and pressure less than 5bar),red LED if one of them opposite these values.

(b) What is the value of voltmeters and ADC and DAC outputs.

[8 pts]



What is the value of temperature if its output is 19mV, What is its output at the temperature Vero(-40C)=2. [8pts] 95) a- Using Thermocouple sensor Type K with 0C reference,

Lipsteins A Lieutennia Engineering Department Canarada of Lepula Faculty of Laplaces in

Time: White

QLa) A liquid level serior has an input range of 0 to 15cm. Use the calibration results given in the table to estimate the maximum hysteresis as a percentage of f.s.f.?

5	18.2	18.2
13.5	8.85	89%
-	777	8.87
10.5:	57	2
	3.61	82.9
1.5	4.16	200
9	3.43	4,43
3.4	14	355
-	7	131
1.5	97.0	2
0	0	0.14
Lavel h con	Oniper volto h	Output radio h

ement results in a value of OLD) A temperature sensor has a span of 20-250C. A mean SSC for the temperature. Specify the error if the accuracy is

Until the possible temperature in each case?

Q2.a) Drive the equation of the bridge offset voltage for the current balance bridge?

- Capacitor 0.01 pt. Specify the attenuation of a 30KHZ signal?
- O2.6) Signal conditioning analysis shows that the following equation must relate output voltage to input voltage. Ve-3.35V=-2.08.0.11

Design circuits to do this using (a) a nomming amplifier (b) a differential amplifier?

Q3.a) A 12-bit bipolar DAC has a 10v reference

- 1- What output voltage results from digital input of 4A6 H.
- 2- An output of 4,74x is needed. What digital input would come closest to this value? By what percentage is the actual output different?

Obb) Using timing diagram, explain the coursol lines that coordinate the operation of

Great Luck

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Electrical & Electronic Engineering Department Intersity of Tripolt - Faculty of Lugistering Spring 2017

Time 2 hr

8 TO 12 &

Q1) Temperature sensor sentitivity is 4Ω/C, in the range (±25°C) and its value at 0°C is 2816, Using Wheatstone bridge copyert its range to yolt, and send its value using (4mA 20mA transmitter), and prepare it for 8bit ADC with voltage reference 0-5Vreft.

What is the digital output of ADC at the temperature -2 "C. [12 pts] (99.) A a) What is the digital output of ADC at the temperature -2 "C.

U2) Accelerometer sensor sensitivity is 0.33mA/ 2 used for measuring. Acceleration in the range (4.20 g). Design signal condition circuits for bipolar (8 bit) ADC with voltage 103 my 109 reference 14V

a) What is the digital output of ADC at the acceleration is -3 g. b) What is the acceleration when the digital output is 06H. - 19 - 6(11.3c)

15Hz. Noise signal 2tlmV with frequency 150Hz, and design filter that Attenuate the (B) Design the signal conditioning circuits to connect the sensor to 10 bit ADC with voltage reference (0-5V), where: sensor output range (-150 - +150 mV) with frequency noise signal to 25%, and taking in account the effect of the filter on the sensor signal Ista oll

RTD with the following table using linear approximation of resistance versus temperature find the value of the RTD at 13°C and design circuit operate heater if the O4) Using Thermocouple sensor Type J with 0-C reference, find the value of its output at 32-C. Design circuit to operate cooler if the temperature is more than 32-C, and using 12 pts Temperature is less than 13°C

	_	
R	-	
-	1000	
10	110.2	
40	1001	
-	107.6	
Imperature (4.)		

O51 What is the sampling and sample and hold and aliasing and oversampling (Draw as you can). [4 pos]

201613

Spring 2017

Time: Smin

I LAB

QLa) An alarm light goes ON when a pressure sensor voltage rises above 4.00 V. The pressure sensor outputs 20 mVkPa and has a time constant of 4.9 s. How long after the pressure rises suddenly from 100 kPa to 400 kPa does the light go ON?

Q1.b) A load cell is calibrated at 21st and has the following deflection/load

When used at 35c , its characteristic changes to the following:

	oad(kg) 0	100	100	150	7,000
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[10 pts]

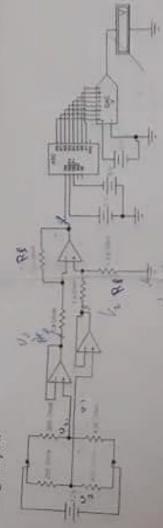
Determine the sensitivity coefficients

Q2.a) A measurement signal has a frequency less than IKH2, but there is unwanted noise at about 1MHz, Design a filter that attenuate the noise to 1% using a capacitor 0.0) of What is the effect on the measurement signal at its maximum of 1KHz (give a comment on the result?? O2.b) Signal conditioning analysis shows that the following equation must relate output voltage to input voltage: V=3.35V= -2.68. Design circuits to do this using a differential amplifier? (33.8) Using timing diagram, explain the control lines that coordinate the operation of ADGRO /O3.b) Design a 5-bit weighted-resistor DAC whose full-scale output voltage is -15v. Logic levels are 1-5v and 0-0v. What is the output voltage when the input is 01010?

HO pts

1/1/2019 spring 2018 Electrical & Electronic Engineering Department Faculty of Engineering Time: 1: 30 hr University of Tripoli -2nd Exam

OI)From the circuit below what is the value of ADC digital outputs and DAC analog output.



about 10KHz ,Design filter that attenuate noise as possible with better effect on the (22) A measurement signal has a frequency 800Hz, but there is unwanted noise at signal(give the 3 attempts with comments). Q3) using accelerometer which sensitivity 0.3mA/g, and using R=200Q for voltage conversion, and using VFC which scale factor 5KHz/V, sampling time O. Isec :

- A) Draw the block diagram of the operation
- B) What is the digital output(in binary) if the acceleration is 11g.
- C) What is the value of acceleration if the digital output is (190)10

and Luck (Zevad Hamza)

University of Tripoli - Faculty of Engineering Electrical & Prestronic Engineering Department

Final Exam Time: 2 hr

12/2/2

Fall 2018

OHA-Using RTD PT10d for temperature range (22C to 190C) design a signal conditioning circuit for (0-3V) ADC (use voltage divider circuit, VS-9V-R1-200Ω).

Desit we will send the sensor output for a distance with same voltage reference.

CoWhat is the ADC digital output if the temperature is 100C.

d-What is the temperature if the ADC output is (10011110).

[14 pts]

4023 Using Acceleration sensor (sensitivity =0.14mA/g), with offset 7mA/a/0g, for the range (±30g) and using voltage to frequency converter VFC (scale factor - 4V/6KHz)

a-Draw the block diagram of the operation.

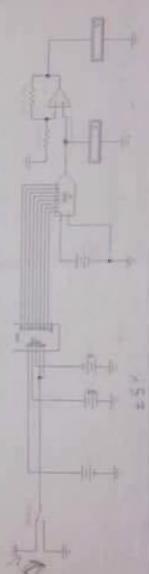
b-Calculate the sensor output range, and VFC output range, digital output of counter if the sampling is each 0.2 Sec.

c-What is the value of the output of the counter if the acceleration is -0.5g.

O3) Barometer sensor sensitivity is 5mV bar, and 5them pot, level sensor for 150cm range used for measuring level (Vx=0Vuse, R1=15042). Design) circuit to turn ON green LED if (level more than 70cm and pressure less than 5bar), red LED if one of them opposite these values:

O4) What is the value of voltmeters and ADC and DAC outputs.

S July



O5) as Using Thermocouple sensor Type K with 0C reference, What is the value of temperature if its output is 19mV. What is its output at the temperature Vers(-40C)=? [8pts]

Electrical & Electronic Fugineering Department Vaculty of Luginteriug Lahersin of Tripoll -

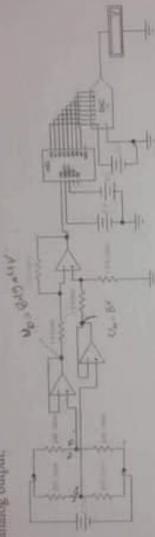
2nd Exam

Time: 1: 50 hr

Spring 2018

HIGH

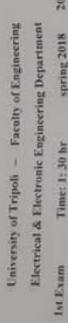
Q1)From the circuit below what is the value of ADC digital outputs and DAC analog output.



about 10kHz. Design filter that attenuate noise as possible with better effect on the Q2) A measurement signal has a frequency 800Hz,but there is unwanted noise at rignal(give the 3 attempts with comments). Q3) using accelerometer which sensitivity 0.3mA/g, and using R=200Ω for voltage conversion, and using VFC which scale factor 5KHz/V, sampling time

A) Draw the block diagram of the operation

B) What is the digital output(in binary) if the acceleration is 11g. C) What is the value of acceleration if the digital output is (190)...



Time: 1: 30 hr

spring 2018

20/12/2018

Ol)What elements of data acquisition system, explain two of them

for temperature range (±40 C), and using R=150 \Omega for converting to volt, voltage Q2) Temperature sensor which sensitivity= 0.11mA/C, and its value @ 0C=5mA supply 12N A- Design circuit to send the sensor output for long distance and for ADC (Vref STO.

B. What is the digital output of ADC if the temperature is 33C, -14C?

C. What is the temperature if the digital output is 88H?

RTD PT100 to measure temperature, potentiometer used to measure the level as O3) Sensor used to measure pressure in range (0-30bar) with sensitivity (7mV/bar) shown in figure. A-Design circuit to rum ON buzzer if (temp is more than 49C or pressure is more 10 bar or level is less than 33cm)

B. Turn ON release valve if pressure is more than 15 bar.



University of Tripoli - Faculty of Engineering

Electrical & Electronic Engineering Department

SE463

Final Exam-

Time: 2 hr

Spring 2019

25/9/2019

Q1) a-What is the meaning of single ended signal, differential signaland give example.

b. What is sample and what is hold and when we use them.

[6 pts]

- (22) Using Temperature sensor (RTD-PT\00),in the range (36C to 90C) and using Wheatstone bridge (Vs=9V, R1=110, R2=120), and using voltage to frequency converter VFC (scale factor= 10KHz/1.12V).
- a- Calculate the sensor output range, Wheatstone bridge output range and VFC output
- output range of the counter, what is the value of the output of the counter if the b- Using a counter to convert to digital with sampling rate 180 sample/Sec. What is the temperature is 750C. 575C

> Draw Block diagram of the circuit.

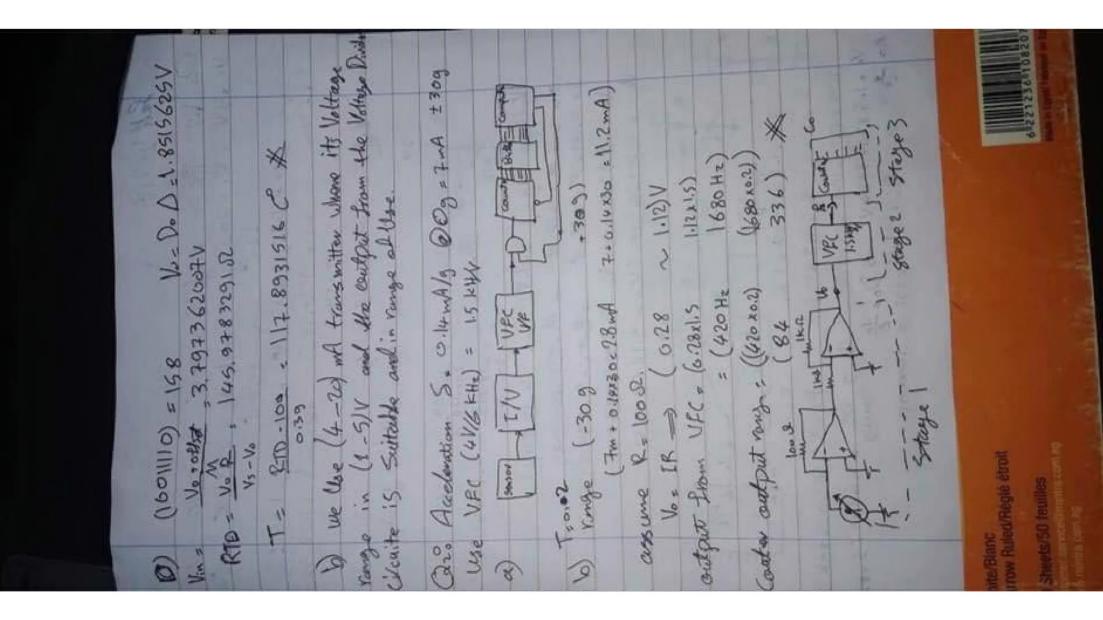
16 mts

- the runge (± 20 g), and the value of its output @ 0 g is 5.2mA, using 190 \Q converting to Q3) An accelerometer sensor sensitivity is 0.145mA/ g., used for measuring pressure in volt resistance, Design signal condition circuits for bipolar (8 bit) ADC with voltage reference ±4V.,
- a) Calculate sensor output range (current, voltage, Binary).
- b) What is the digital output of ADC at the acceleration is 8 g.
- c) What is the value of acceleration when the digital output is 0DH,92H.
- 15KHz, design filter that attenuate the noise to 18% of its value, calculate the effect on the d) If the frequency of the signal is 120Hz and there is unwanted noise with frequency [05 pts.] sensor output range.

O4) Using RTD with the following table using Quadratic approximation of resistance versus temperature find the value of the RTD at 12.4°C.

20	108.3
15.	107.1
10	1063
40	105.1
0	103.6
Temperature (4C)	Meditinace (ft)

Good Luck (Zeyad)



Q:0 5mlk, (30-120) C VR 0.5 KHz/V E. 10th VPC = 6.5 x 560 = 280 Hz , Co = 280 xul = 28 * 250 0.13 mA/box rang + 20 box @ Obors chind Rollso. Amore range ((-22 xo.12)44m. 1.4 ml no boxols-)14= 6.6 ml as Snote andered Signed a Constant active Signed depense on the Carameters of the Circuit 120x24. Gro. 600x0.5, 300Hz 300x3,1230) we Was Sangle and hold because ADC needs a Pinite ad: Hevertil Figual: a Notheronce Signal at a amount of time to measure the Signal Voltage. WHYPORUM (1.4x150= 210W ~ 6.6x150; 990 W) -4-0.310 M+0 Byt M, 智 16-MVin+0 Myt Das 14% takes - 149.2 - 149 = (10110011), * O3 50 1 1 a) in 8bo Led Do => ((8x0,17)+4) x150 = 756 ml Say Tamporture 1120° Vo. 112x5 w/2 560 w) Nothery range (30x5mVKc 150mV Breymag range (150x0.5 = 75 Hz Courter range (75x0.1 = 7.5.7 No. 400, 0.766 - 80 = 1.6 Spiny 2018

University of Tripoli - Faculty of Engineering Electrical & Electronic Engineering Department

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Of What elements of data acquisition system, explain two of them

O2) Temperature sensor which sensitivity— U/IIImA/C, and its value @ 0C=5mA, for temperature range (±40 C), and using R=150 Ω for converting to volt, voltage V21 ylqquis A- Design circuit to send the sensor mutual for long distance and for ADC (Vrei 125-0

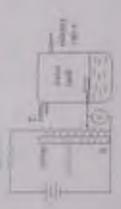
B-What is the digital output of ADC if the temperature is 33C, -14C?

C-What is the temperature if the digital output is S8H?

O3) Sensor used to measure pressure in range (0-30har) with sensitivity (7mV/bar) RID PT100 to measure tempetature, potentionieter used to measure the level as shown in figure.

As Design circuit to turn ON buzzer if (temp is more than 49C or pressure is more 10 bar or level is less than 33cm)

B-Turn ON release valve if pressure is more than 15 har.



Good Luck (Zeynu Hantza)

University of Tripoli - Faculty of Engineering Electrical & Electronic Engineering Department

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OliWhat elements of data acquisition system, explain two of them

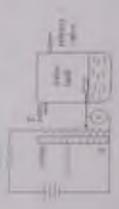
Jor temperature range (±40 C), and using R=150 Ω for converting to volt, voltage Q2) Temperature sensor which sensitivity- 0.11mA/C, and its value in 0C-5mA V21 Viddus A- Design circuit to send the sensor output for long distance and for ADC (Viet O-4VL

B- What is the digital output of ADC if the temperature is 33C, -14C?

C - What is the temperature if the digital output is 88H?

Q3) Sensor used to measure pressure in range (0-30bar) with sensitivity (7mV/bar) RTD PT100 to measure temperature, potentionater used to measure the level as shown in figure. A-Design circuit to turn ON buzzer if Ctemp is more than 49/2 or pressure is more 10 bar or level is less than 33cm)

B-Tum ON release valve if pressure is more than 15 bar.



Record Luck (Zeyno Hamza)

Just 1900

Lieutrante of Velpolt Burning department

Tables (II)

A. H. a. teams of 15.5 pay in togethed, first the sumber of bits mass any for the AIM. The OLAN AN ADCTION Will encode pressure data is required. The man stated is obtain in Vipal NEUTRIC IS 10 0 V

is that the masonium measurable pressure

given by A. - - What microsities are produced by digital inputs of 1881, 7APC Older An 8-bit DAy well a 3,00-V reference contracts to a light source with an amenanty

The state of the south and the south are techniques employed for reference lengthen compensation

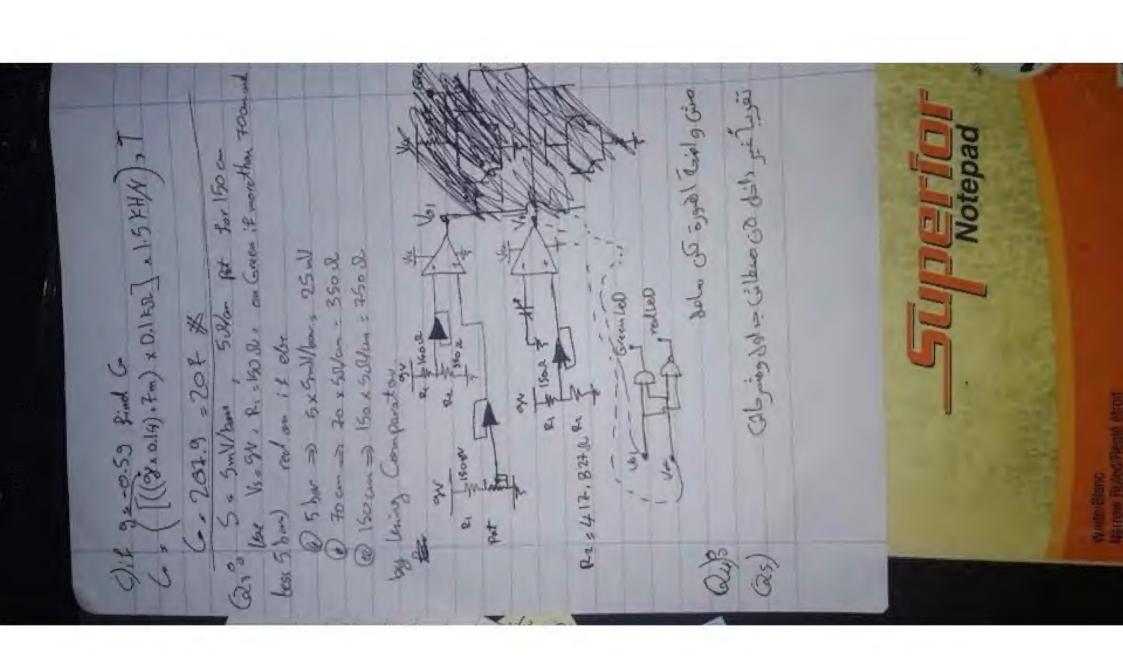
mult the bestge 11 the samply in 10 N and the 18377 is placed in a bath as OC, the the rather of to nattitude bridge. The RID is used in a boules cortain with Rt - Rt - 500s2 and Rt is sprintlybe register, used to Pozet An RTD has a - 0.005 C. R = 500D, and a disupation constant of Po-30 mW/C at 20 C. to mall the lunder

repaid as a seed of 200 leages the races of the perty 330 degree. What is the resolution of this QZ c) A resubscelement of a wint-sound put to mode from 10 in at 100 D/m resettings and is (12 pt)

A O.S. a) Describe the working principle collinear variable differential transformer?

at 25C. The dissipation factor is given as Pre-25mW/C. What is she marsimum current that ACTOSA) A muon gauge has GF - 2.06 models and is made from wire with gm-0.0034/C My lean be placed through the SG to begin self hearing errors below I microrof amin't

Of 51 Water is pamped through a 1.5m diameter pipe with a time velocity of 2.510s. Find the volume flow rate and aveight flow rate. The weight denyty is 62.4 lbritis Assessed I then



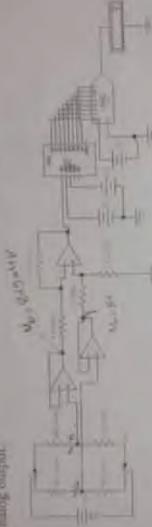
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Time: 1: 30 ft

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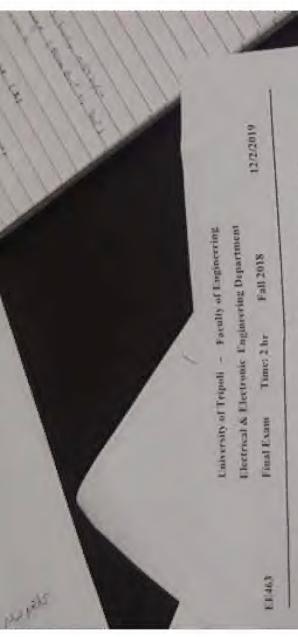
Q) From the circuit below what is the value of ADC digital outputs and DAC malog output



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A) Draw the block diagram of the operation

B) What is the digital output(in binary) if the societation is 11g. C) What is the value of societation if the figital output is (190):



Off a-Using RTD PT100 for temperature range (22C to 190C), design a signal conditioning corout for (0-3V) ADC, tase voltage divider circuit. Vs-9V, R1=2002). b-H we will sord the sensor couped for a distance with same volume reference

c. What is the ADC digital output if the temperature is 100C

d What is the temperature if the ADC output is (10011110).

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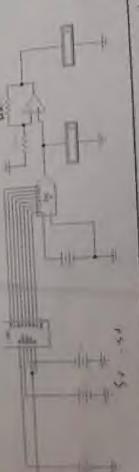
Q2) Hing Acceleration sensor (sensitivity, 0,14mA/e),with offset 7mA/a/by, for the range (=30g) and using voltage to treptionsy convener VFC (scale factor 4V/6KHz)

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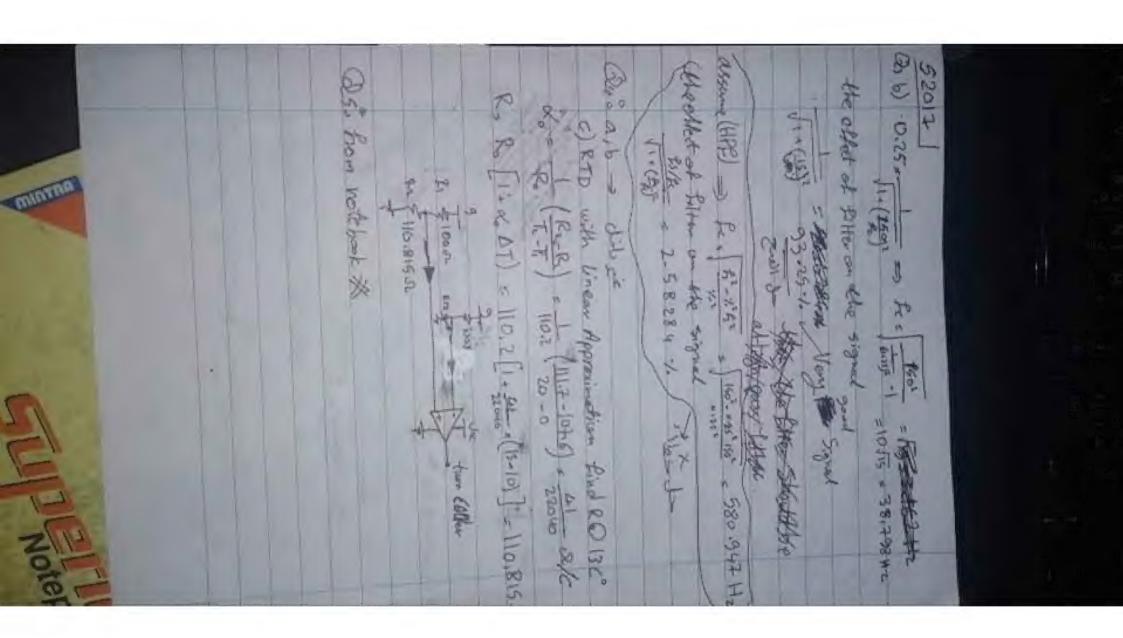
c. What is the value of the output of the counter if the acceleration is -0.5g. sampling is each 0.25cc

range used for measuring. level (Ns. 9Vuse, R1= 150 Ω), Design) circuit to turn ON green 110 98-1 Q3) Barometer sensor sensorivity is 5mV bar, and 5them pot, level sensor for 150cm 1 (Darf Hevel move than Tuem and pressure tess than Sharked LLD if one of them opposite these values.

Out What is the value of voltmeters and ADC and DAC outputs.



251 at Using Thermocouple sensor Type K with 0C reference, What is the value of tions if its output is 19mV, What is its output at the temperature Verof-40C)=7. [8pis] Good Luck (Zeyad



University of Tripoli - Faculty of Engineering Electrical & Electronic Engineering Department

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OliWhat elements of data acquisition system, explain two of them

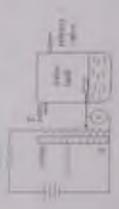
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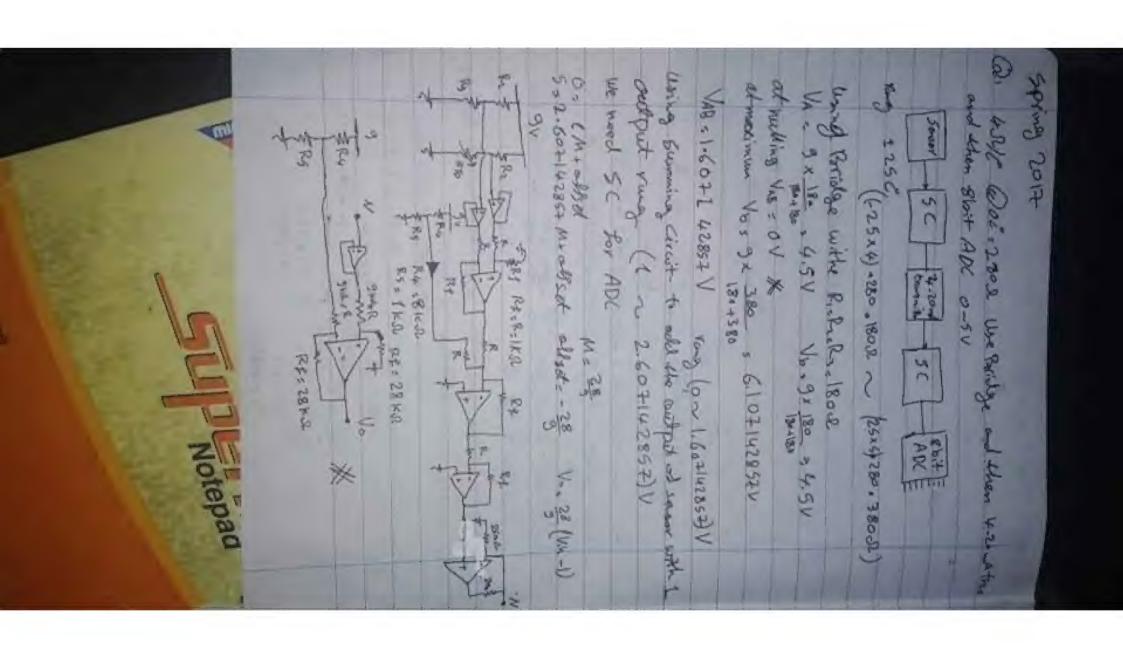
C - What is the temperature if the digital output is 88H?

Q3) Sensor used to measure pressure in range (0-30bar) with sensitivity (7mV/bar) RTD PT100 to measure temperature, potentionater used to measure the level as shown in figure. A-Design circuit to turn ON buzzer if Ctemp is more than 49/2 or pressure is more 10 bar or level is less than 33cm)

B-Tum ON release valve if pressure is more than 15 bar.



Record Luck (Zeyno Hamza)





P P 20.6

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Time I have

Old Temperature service service at my 1s 402 C. on the range (=25+C) and its value at 0+C or 2811/1, I since Wheatenate braces offer on 16 range to 3 oft., and sent its value using (4mA What is the digital company of ADC with a solume reference 0-5Vred.

What is the digital company of ADC with temperature 2 °C [12 ps] (599.) A 2) What is the digital couple of ADC is the temperature -2 -C.

CON Accelerometer sensor somnivny to 0.33mA. Lused for measuring. Acceleration in the mayor to be Design rightal condition creates for hypotal (8 ha) ADC with volume 301 4= 801 reference 14%

a) What is the dignal output of ADC as the acceleration is 3 g. https://dignal.comput is 06H. . - 19 -- + (12.4s)

15FE. None symul they with frequency 150Hz, and deugh filter that Attenuate the notice signal to 25% and taking it account the effect of the filter on the sensor signal DET Design the signal conditioning cyclones to connect the sensur to 10 bit ADC wallt voltage reference (0-5V), where, sensor carpat range (4150 - +150 mV) with frequency [10 pb]

RTD wafe the following table using finear approximation of resistance versus temperature find the value of the RTD at 17°C and design circuit operate beater if the (34) Dieu Themocoupés ser or Type I with O'C reference find the value of us output at 32-C, Design orant to exerate confor if the temperature is more than 32-C, and using (12 pin) temperature = less than 13%

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11	ero Si Jam
3.0	110.2
	10/8.1
-	1878
B	Backtone (T)

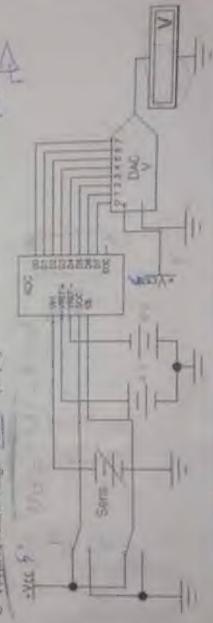
Of What is the semple and sample and hold and although and excessing throw as I mil Son can

Electrical & Electronic Engineering Department University of Trippell - Faculty of Engineering Time: 1:30 hr - 二十七十七八 EE463 7

Ol) Temperature sensor sensitivity is 0.42mA/ C., used for temperature range (= 50 C) Design signal candition circuits for bipolar (8 bit) ADC with voltage reference =3V a) What is the digital output of ADC at the temperature 31 C, -20 C. b) What is the temperature when the digital output is B611, 110 pts1

reference (0-10V), where sensor output range (-100 - +100 mV) with frequency 25Hz. Q2) Design the signal conditioning circuits to connect the sensor to 8 bu ADC with voltage Noise signal 20mV with frequency 260Hz, and using filter that Attenuate the miles signal to 29% of its value, and taking in account the effect of the filter on the sensor signal, [[10 pm] (33) Using pressure sensor which sensitivity is 23mVrbar, and temperature sensor which sensitivity is 1000 c and its value at zero C =3000. Design circuit which open Valve when the pressure is more than 15har, and operate heater when temperature is less than 20 C, and how DE30 Jc . T. operate Red LED when both of them are ON 110 pm

O4) What is the digital value of the ADC output and what is the analog value of DAC output at the temperature D3 C, and -30 C. Where sensitivity=15mW C, sensor output at 0 C=100mW, sensor range=±50 C. [10 pm]



Good Luck (Zeyad)

THE WAY IN THE RIGHTS

Laurensty of Irigali - Fraulty of Engineering Placing Department

Fonal Exam | Troop 2 hr Spring 2017

Of Femperature sensor sensority of 4(2° C., to the range (4.25°C) and its value at 0°C is 28002. Using Whentstone bridge conven its range to solt,, and send its value using 44m/s Than to mante 1 and prepare it for this Albe, with voltage reference 0-5Vred [12pt] a) What is the digital output of ADC as the resuperators -2 oC

Q21 Accelerancia sense sensitivity w 11 33 mA/ Q, used for measuring. Acceleration in the range in 30 gr. Design wees a condition circuits for bipolar (8 bit) ADC with voltage

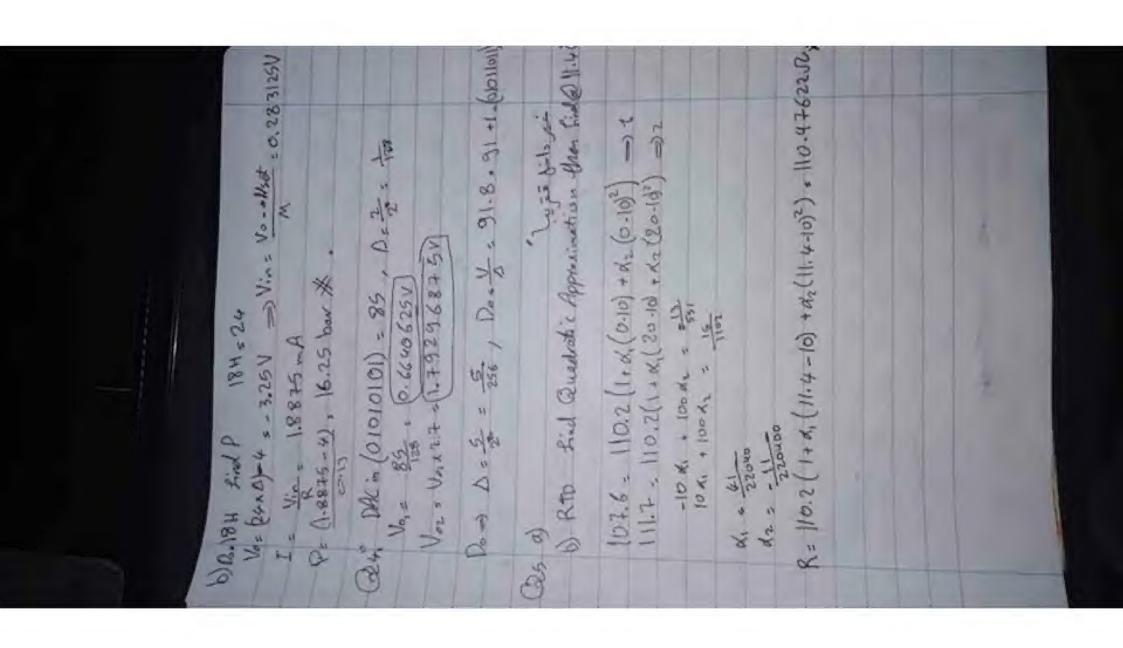
b) What is the acceleration when the digital output is 06H. - 14. [12 red] as What is the digital output of ADC at the acceleration is -3 g 11 E

15Hz. Notice rignal 20mV with tecquoney 15UHz, and design filter that Attenuate the (B) Design the signal availablesing criticity to connect the terrain to 10 bit ADC with voltage reference (0-5V), where sensor nutput range (-150 - +150 mV) with frequence noise signal to 25% and taking or account the effect of the filter on the sensor signal, かい おお 年一年 110 gels

RID with the following table using linear approximation of resistance versus temperature find the value of the R113 at 17 C and design curtain operate heaver if the O4) Using Thermocouple servor Type I with 0-10 reference find the value of its output at JEC Design corour to operate works if the temperature is more than 32°C, and using (52 phs) temperature is less than 13 °C.

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Temperatur 1C1	Resident (II)

QS) What is the samples and sample and bold and aliasing and oversampling (Draw as 14200 your can) Good Lack (2c) ad!



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THE HE Metrical & Pastrona Engineering Department Lumm, 1 - 4th ten



1- Explain white is meant by active and positive sensor? Colo

2- State the tasks of signed coparitivities?

Is Using pivels draggam, describe a data acquisition system?

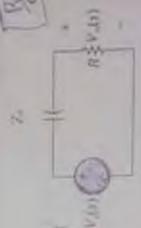
Of b). An instrument measures resistance from 0 to 1500 D. What is the uncertainty in an indicated measurement of 3970 of instrument has an accuracy of (a) ±0.5% of 15 (b) ±0.5% HIS PART

and a high-empedance not detector. Find the current required to null the beidge if R.) changes O224 A current belance bridge has RIPR-10KD, RIPIKD, Ra-9500, Re-5062, Ve-10V.

O2.b) An air conditioning shoold come on when the sum of the temperature and hamidity accuses voltages does above IV. A threshold circuit in the air conditioner requires 5V for turn-from Design an interface circuit to connect the two sensors to the air conditioning unit?

(35 a) For the following circuit:

1- Explain the behavior of the circuit aben the frequency of the source characte from zero to Infinite?



Denve the expressions of the transfer function and the cutoff frequency OS-b) A displacement sensor has an input range of 0.to 3cm and a standard supply solicine if Using the calibration results in the table, estimate the sensitivity caefficients associated with supply voltage variations?

Internal to the second		2	elin .	0			arg
utpot V (m), Vivil.5)	6	16.5	5)	11	(4°) port (4°)	586	150
stpart V (mly, Virgo)	0	17	517	-	153		eric

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Singlificant | Links I like

12.2018

Q1) Temperature sensitivity in 4D C. in the range (1251C) and its value at 01C is 2802 Using Wheatstone bridge conven to range to volt, and send to value coing 44mA 20mA transmitter 1 and prepare is for Nhis ADC with vollage reference 0-SVreif [Light] a) When withe digital output of ADC at the Respectator - 2 ° C

Q21 Accelerances some seasoning is 11 33mA/ Q, used for measuring. Acceleration in the range (# 30 gs Thenga worst condition streams for hipolar (8 bit) ADC with voltage

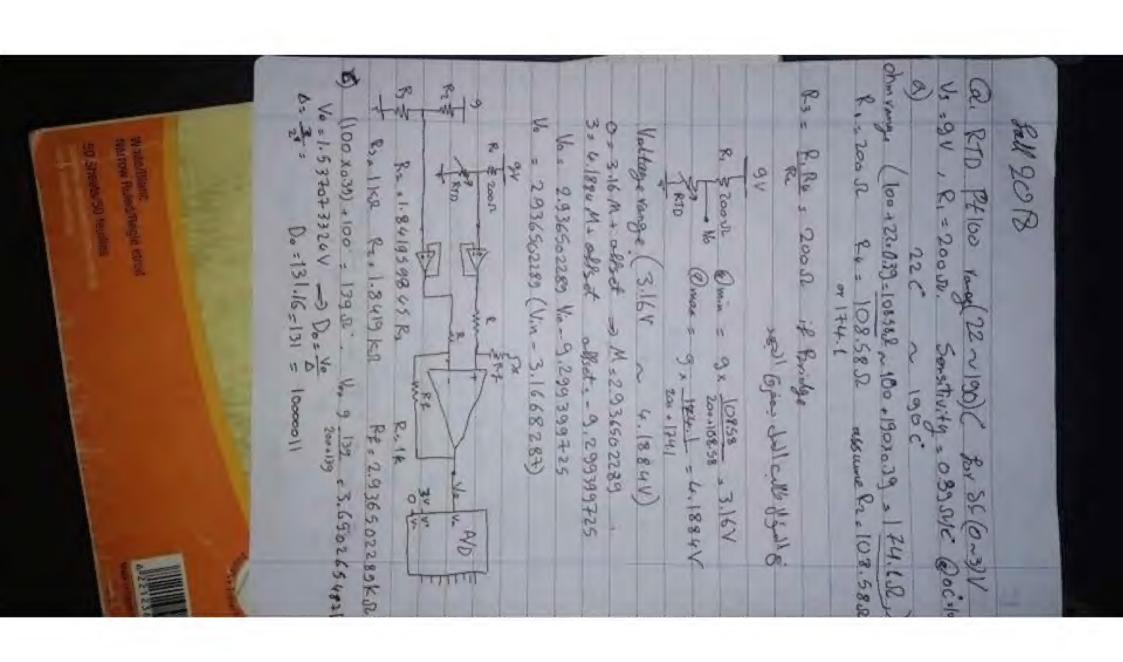
- a) What is the degree output of ADC as the accederation is -3 g. U.E.

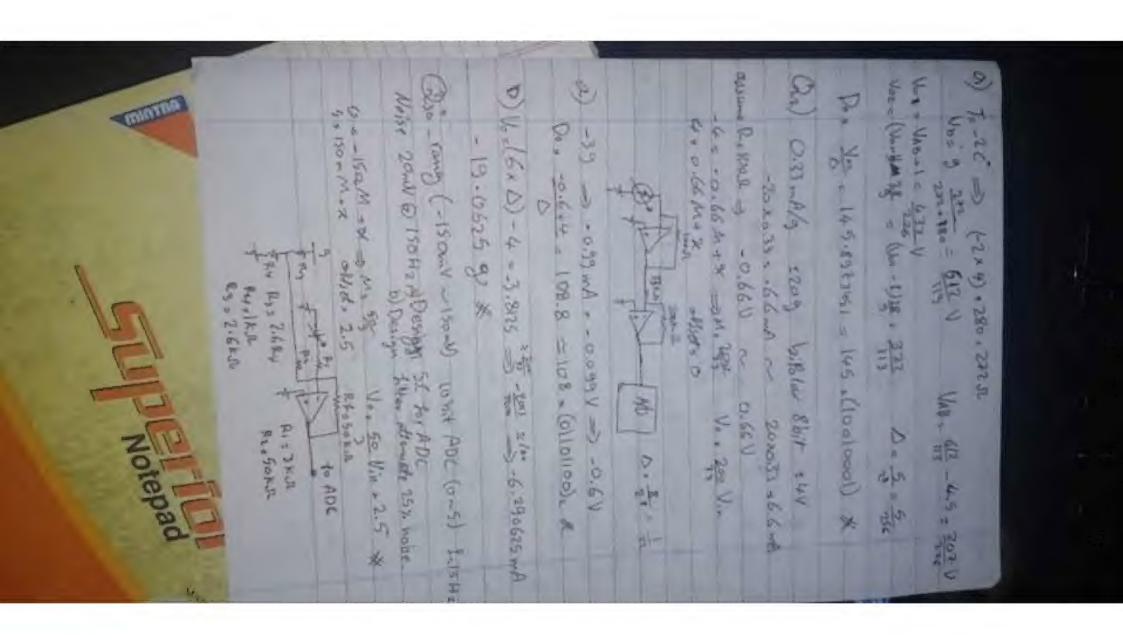
 b) What is the acceleration when the dipital output is 06H. 14. [12 pa]
- 150L. Notic ugnal 20x1V with Requency 150lfz, and design filter that Attenuale the (B) Design the signal sendilitering establis to connect the semior to 10 bit ADC with voltage reference (0-5V), where sensor mapus range (-150 - +150 mV), with frequence notes signal to 24%, and taking to account the effect of the filter on the sensor signal. 100 29 CO 19 - W

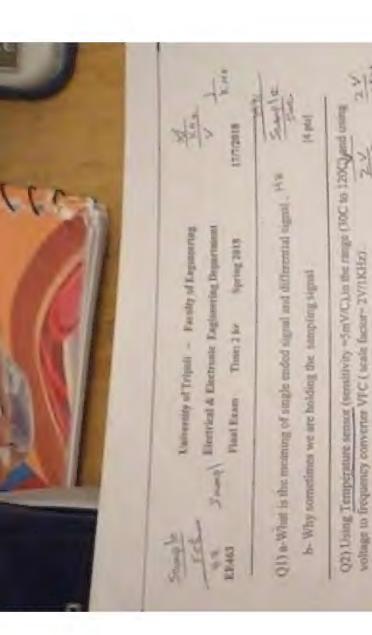
500 RTD wast the following table using linear approximation of resistance versus temperature find the value of the RTD at 13 °C and design circuit operate heaver if the Ost Using Thermocoupic servor type I with the reference find the value of its output at 32. C. Design coront to operate usoler if the temperature is more than 32. C, and using (2) (t) (1) 3 teroperature is less than 13-t.

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ed) hos	200
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0	1674
NEW PACE	IOI an
file profession	The Par

Q5) What is the compline and sample and bold and aliasing and oversampling (Draw as (UES NO E







(3) Barouncing sensor sensitivity is 0.13mAt but, used for measuring present in the range (a 20 g), and the value of its output @ 0 but is 4mA, using 150 ft, focular signal condition circuits for bipolar (8 bit) ADC with voltage reference =4V

Using a counter to conven to digital with sampling rate 100-amplierSec. what it the value of the output of the counter if the temperature is 1120.

Calculate the sensor output range, and VFC output center

a) What is the daggtal output of ADC at the contact of H 8 bar b) What is the value of pressure when the digital output is 1814.

ESE SOO

[12 [12]

G4) What is the value of volumeters and ADC couper

QS) as Using Thermocouple stenaes Type I with 40C reference .What is the value of its output at the temperature 120C b- Using RTD with the following table using Quadratic approximation of resonance versus temperature find the value of the RTD at 11.4°C.

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university of Pripoli - Faculty of Engineering Fleetrical & Electronic Engineering Department Time: 1: 30 hr

1st Exam

EEAN

4/11/2017 Full 2017

Ot) What is the basic elements of a data acquisition system, explain two of them?

(22) What is the deference between single ended signal and differential signal ?

03) A length meter range is (0 - 5.5m) has quoted inaccuracy of ±2 % F.S., what (33) A lengur measurement error expected for this instrument in centimeter.

(24) What is Zero drift and sensitivity drift?

Q5)Calculate the value of the following components:

1000 = 0000 3c = 3 T = 40101 V=000001 look = Greens S

06)RTD with sensitivity $3\Omega/\dot{C}$, and its value= 320Ω @ $0\dot{C}$, use wheatstone bridge to calculate its range in volt for temperature range (0 ~ 70 \dot{C}). design s.c. 2030) -5 % Red Green Violet Red orange

circuit for ADC which voltage reference (0 ~ 4V).

-Get the temperature equation

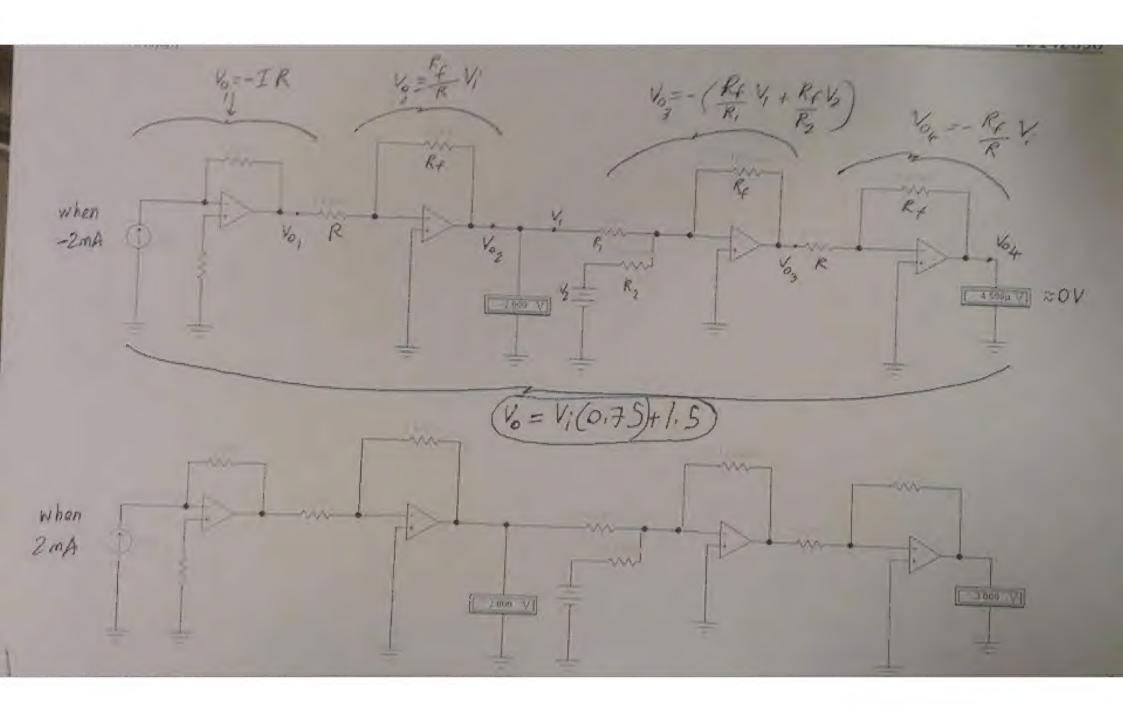
07) sensitivity of pressure sensor is (2.8 mA/bar) working in the range (0~15bar), in a noisy area, design a circuit to transmit its data using (4m ~20mA) transmitter, What is the new range in volt of the sensor.

Good Luck

Better Right Or your

90005

Best



Design Signal and tioning 2 2/6 les 10.2×10 m Jange circuit for (0-34) AD (2~2ma) = 4,6.75)+ Accelerometer sansition colculate it's output 1/2 = 1/1/1-a 0.2x-10, 3 = 2 M+ offsey 0 =-2m+ot W = W

N 60 0 1.4 i 70 6.25=6.2 5=1-8M+OFFet V: 6.25 5=0.8M =>

Caralle of Puzzievi ing I sulversall at Irraph Beatrical & Perfession Lupiacering Department

1911

Spring July

THAT I I may With some bridge convert its ringe to only noted its Valley while to with (2) Temperature service separation in its Committee respect (25°C) and its value as One 25 mel consmitter a rapid prepare of the Ath. With voltage reference to 3 Viril HEZII at What is the digital mappet of ALK as the temperature -2 -C

the radice. To all Design sepal condition cursule for hipolar (8 bit) AIX - other admirereletence Av

at What re the should couper of ADIC at the acceleration is -3 at hi What is the a common when the digital serges is total

[12 pdi]

Wolking indicessor (D. 591), white non-resident stage (150 mV) with linguistics (150), house typical 20mV with frequency (500), and design filter that Australia dis-1981 December should condition to correct the sentence to 10 he ADC with mose suggestive the and taking to second the effect of the filling in the tensor signal

temperature. II - I the yellow of the P. H. at 11 - C. and theyer afrent, openie ficultor it the partitions There was programmed by the Undergot (Charles Sept. Control of the Angles of its useput at Despitement to speak visite if the temperature is more dian 32°C, and taken PERMITTED VENEZIE (12 gest inches and table use tracal approximation of

as when the month and sample and bold and altestic and intersampling (1950) in the transfer of the analysis of the transfer of 181101 Gund Luck (Teym!)

The state of the

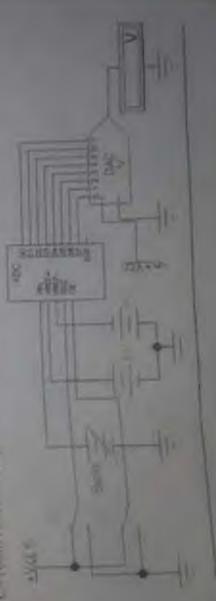
21) Temperature service sensitivity is 0.42mA. C., used for temperature range to 30 C). Dealgo algoral condition circum for bipotar (8 bit) ADC with voltage reference and a) What is the divini ourput of ADC at the temperature 31 C, 200 C

b) What is the compositor when the digital earpures Belt. [13] pail

Noise Nignal Menty with trace and the filter that Amendie the ninte Lignal in 1995 of the Valor, and taken a second to the sector tigral (10 pe) O2) Design in ... mill condition on converte to general the same to 8 bit AIX, with voltage reference (U-10V), where, server output range (-100 - +100 mV) with frequency 2594s.

On) Come and the control of the cont a trem 150m. and agentale heater when compensative to less than 20 C. operate Ace | 11 auto both of them are DM, | 10 pp. The street

CALL What is my or more and value of the ADC majors and what is the apollog value of DAC companies to the more and Companies and the control constitution of the control of



Good Luck (Actyd)

Contrady of Pripals - Paralty of Englavering Cherebral & Districtic Engineering Department Full Lans 4 4 C Please France

*10 0--

Q1) a-Using RTD PT100 for temperature range (21C to 190C), design a signal conditioning metal for (0-3V) ADC line voltage divider almost Ver-9V,R1=200G).

" We will send the import suppl for a faithful with more veltage reference.

o-What is the ADC digital corpor if the temperature is 1900.

d-What is the temperature if the ADC output is (10011119).

Ved = 2V Hamil

(Q2) Using Acceleration senter (nemoticity =0.)4mA2(with order 7mA309, for the range (4302) and uning voltage to frequency converter VFC (scale factor 4V/nKFbs). a-Draw the block diagram of the operation.

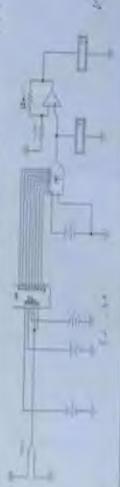
b-Calculate the sensor output range, and VFC output nage, digital output of tounter of the sampling is each 0,75ec.

to What is the value of the output of the commer if the acceleration is 40.5g.

O3) Benometer sensor seculivity is 5mV/ her , and 500cm per, level sensor for 150cm ongo used for measuring level (Vy=9Vune, R1= 150 to), Design) circuit to turn ON green LED if (level more than 70cm and permane less than Star), and LED if ope of them opposite these values.

10 110

(A) What is the value of voltmeters and ADC and DAC ourses.



(b) - Using Thermreusphe sensit Type K with 9C primarion, What is the value at contrict if he weight in 19mV, What is the output in the sempositive Verig 40(C) (19m)

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Conversor of Tripoli - Euroby of Lagrancing The trend & Decrement Perferenting Days owen

A TOPE STORY

Oth Temperature providence in too C. in the range (s.29°C) and as value as 0°C to 28002. Using Wheatstone bridge convert its range to volt,, and send its value using (4mA -30mA transmitter), and propule it for 85st ADC with voltage reference 0-5 Vref. at) What is the deplat output of AEXC as the temperature -2 +C Q2) Accelerometer sensor sensitivity is 0.33mA 9, used for measuring Acceleration in the campe (x, 20 g.). Design signal condusor circuits for bipolar (8 bit) ADC with voltage reference (4V)

a) What is the digital output of ADC at the acceleration is -3 g +17 b) What is the acceleration when the digital output is 0414. - 14 12 pel

15Hz, Noise signal 20mV with Bequency 150Hz, and design Olice that Attenuate the (3) Design the signal conditioning circuits to councer the sensor to 10 lbs ADC with noise signal to 25%, and taking in account the effect of the filter on the sensor agend voltage reference (0-5V), where: sensor output range (-150 -- +150 mV) with finepoency V. . D. 17 4. 15 1001

Day ETO (Ne d RTD with the following table using linear approximation of resistance versus temperature find the value of the RTD at 13 °C and design circuit operate locator if the Q4) Using Thermocoumic sensor Type I with 0°C reference , find the value of its compan at 12°C Design circuit to operate cooler if the temperature is more than 32°C, and using temperature is less than 13°C.

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R	188.	
. K2	1001	
180	118.2	
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Deserving (C)	Brinstann (D)	

OS) What is the sampling and sample and hold and aliasing and oversampling (Draw as TOTAL CARRY Good Lack [Local]

University of Tripoli - Faculty of Lingineering

Electrical & Electronic Engineering Department

3 Final Exam-

m- Time: 2 ftr

Spring 2019

25/9/2019

Q1) a-What is the meaning of single ended signal, differential signaland give example.

b. What is sample and what is hold and when we use them.

for near

1021 Using Temperature sensor (RTD-PT)00),in the range (30C to 90C) and using Wheatstone bridge (Vs=9V, R4=110, R2 120), and using voltage to frequency converter WPC (scale theter | 10KHz/1,323/2.

- a- Calculate the sensor output range, Wheatstone bridge output range and VFC output
- output range of the counter, what is the value of the output of the counter if the temperature is 1600. 550 b. Using a counter to convert to digital with sampling rate 180 sample/Sec, What is the
 - c- Draw Block diagram of the circuit.

O THE

- the range (+ 20 g), and the value of its output @ 0 g is 5.2mA, using 190 O converting to O3) An accelerometer sensor sensitivity is 0.145mA/g, used for measuring, pressure in volt resistance, Design signal condition circuits for bipolar (8 bit) ADC with voltage reference =4V.
- a) Calculate sensor output range (current, voltage, Binary).
- b) What is the digital output of ADL, at the acceleration is 8 g.
- c) What is the value of acceluration when the digital output is 0DH 92H.
- 15KHz, design filter that attenuate the noise to 18% of its value, calculate the effect on the d) If the frequency of the signal is 120Hz and there is unwanted noise with frequency sensor output range.

Q4) Using RTD with the following table using Quadratic approximation of resistance versus temperature find the value of the RID at 12.4°C.

20	108.3
16	1001
=	106.3
40	105.1
0	101.6
Testiperature (41)	Restituter (O)

er

2310

Time: Smin

Spring 2017

18/4/2017

pressure sensor outputs 20 mV/kPa and has a time constant of 4.9 s. How long after the pressure rises suddenly from 100 kPa to 400 kPa does the light go ON? QLa) An alarm light goes ON when a pressure sensor vultage rises above 4.00 V. The

Q1.b) A load cell is calibrated at 21c and has the following deflection/load characteristic:

Louis Lys		京	110	150	200
tion (mm)	0	_		7	

When used at 35c , its characteristic changes to the following:

7200	4.6
051	333
160	2.4
105	27
0	0.3
Loadike	Deflection (mm)

[111 pts]

Determine the sensitivity coefficients

0.01 pt. What is the effect on the measurement signal at its maximum of 1KHz (give a Q2.a) A measurement signal has a frequency less than 1KHz, but there is unwanted noise at about IMHz, Design a filter that attenuate the noise to 1% using a capacitor comment on the result?? O2.b) Signal conditioning analysis shows that the following equation must relate output voltage to input voltage: Ve=3.35Ve - 2.68. Design circuits to do this using differential impliffer? (33.8) Using timing diagram, explain the control lines that coordinate the operation of ADCS

(Q3.b) Design a 5-bit weighted-resistor DAC whose full-scale output voltage is -15v. Logic levels are 1-5v and 0=0v. What is the output voltage when the input is 01010?

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University of Tripoli - Faculty of Lugimeering Electrical & Prestronic Lugimeering Department

Final Come Trace 2 hr Fall 26

12/2/2019

ODD #-Using RTD PT10d for temperature range (22C to 190C) design a signal conditioning circuit for (0-3V) ADC (use voltage divider circuit, Vs=9V.R1=200Ω).

bost we will send the sensor output for a distance with same voltage reference.

CoWhat is the ADC digital output if the temperature is 100C

d-What is the temperature if the ADC output is (10011110).

[14 pts]

O23 Using Acceleration sensor (sensitivity =0.14mA/g), with offset 7mA/a0g, for the range (±30g) and using voltage to frequency converter VFC (scale factor = 4V/6KHz)

a-Draw the block diagram of the operation.

b-Calculate the sensor output range, and VFC output range, digital output of counter if the sampling is each 0.2Sec.

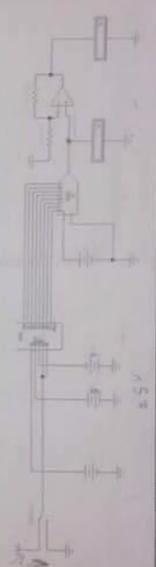
c-What is the value of the output of the counter if the acceleration is -0.5g.

10 pts]

O3) Barometer sensor sensitivity is 5mV bar, and 5Ω/cm por level sensor for 150cm range used for measuring level (Vy=0Vuse, R1=150 Ω). Design) circuit to turn ON green LED if (level more than 70cm and pressure less than 5bar),red J.ED if one of them opposite these values.

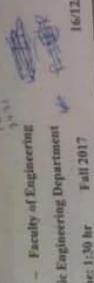
Q4) What is the value of voltmeters and ADC and DAC outputs

s pris.



OS) as Using Thermocouple sensor Type K with 0C reference, What is the value of temperature if its output is 19mV, What is its output at the temperature Vers(-40C)=? [8pts] Good Luck (Zeyad)

10.46 Electrical & Electronic Engineering Department University of Tripoli - Faculty of Engliseering Time: 1:30 hr ナイトナカナ EFAST OF 1114

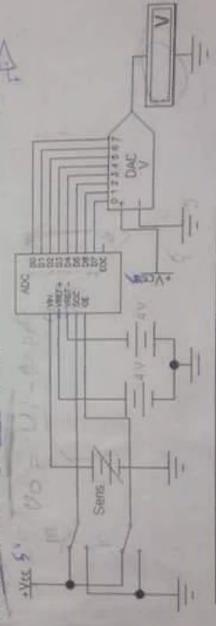


Q1) Temperature sensor sensitivity is 0.42mA/ C., used for temperature range (± 50 C). Design signal condition circuits for bipolar (8 bit) ADC with voltage reference ±3V.

b) What is the temperature when the digital output is B6H. [10 pts]

Q2) Design the signal conditioning circuits to connect the sensor to 8 bit ADC with voltage reference (0-10V), where: sensor output range (-100 - +100 mV) with frequency 25Hz. Noise signal 20mV with frequency 260Hz, and using filter that Attenuate the noise signal to 29% of its value, and taking in account the effect of the filter on the sensor signal. [10 pts] Q3) Using pressure sensor which sensitivity is 2,3mV/bar, and temperature sensor which sensitivity is 100/ C and its value at zero C =3000. Design circuit which open Valve when the pressure is more than 15bur, and operate heater when temperature is less than 20 C, and 1000 operate Red LED when both of them are ON, 110 pts1

RAD To a 12 O4) What is the digital value of the ADC output and what is the analog value of DAC output at the temperature 23 C, and -30 C. Where sensor sensitivity=15mV/ C, sensor output at 0 C=100mV, sensor range=±50 C. [10 pts]



Good Luck (Zeyad)

University of Tripoli - Faculty of Engineering Electrical & Electronic Engineering Department

Time: 1: 30 hr

1000

Fall 2017 4/11/2017

Q1) What is the basic elements of a data acquisition system, explain two of them?

Q2) What is the deference between single ended signal and differential signal?

Q3) A length meter range is (0 - 5.5m) has quoted inaccuracy of ±2 % F.S., what is the maximum measurement error expected for this instrument in centimeter

O4) What is Zero drift and sensitivity drift?

Q5) Calculate the value of the following components:

2/2/2

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1000 - Red = 2

Green Violat Red orange Red

O6)RTD with sensitivity 30½C, and its value= 320 Ω @ 0C, use wheatstone bridge to calculate its range in volt for temperature range (0 – 70 C). design s.c. circuit for ADC which voltage reference (0-4V).

Get the temperature equation

Q7) sensitivity of pressure sensor is (2.8 mA/bar) working in the range (0-15bar), in a noisy area, design a circuit to transmit its data using (4m -20mA) transmitter. What is the new range in volt of the sensor

Good Luck

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Best 4
guess 3
guess 4

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